

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven
Regions of Sichuan Province
CDM – Executive Board



page 1

**CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD)
Version 01**

CONTENTS

- A. General description of CDM programme activity (CPA)
- B. Eligibility of CPA and Estimation of Emission Reductions
- C. Environmental Analysis
- D. Stakeholder comments

Annexes

Annex 1: Contact information on entity/individual responsible for the CPA

Annex 2: Information regarding public funding

Annex 3: Baseline information

Annex 4: Monitoring plan

NOTE:

- (i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.
- (ii) The coordinating/managing entity shall prepare a CDM Small Scale Programme Activity Design Document (CDM-SSC-CPA-DD)^{1,2} that is specified to the proposed PoA by using the provisions stated in the SSC PoA DD. At the time of requesting registration the SSC PoA DD must be accompanied by a CDM-SSC CPA-DD form that has been specified for the proposed SSC PoA, as well as by one completed CDM-SSC CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the SSC PoA must submit a completed CDM-SSC CPA-DD.

¹ The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

² At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 2

SECTION A. General description of small scale CDM programme activity (CPA)

A.1. Title of the small-scale CPA:

CPA-XX: Rural Household Biogas Digester Project Activity in **CityName**

Version: **XX**

Date: **XX/XX/XXXX**

A.2. Description of the small-scale CPA:

The **CPA-XX(CityName)** is a real case of the PoA proposed by Sichuan Wuhai Environmental Protection & Bioengineering CO., LTD. (Wuhai Company) that is based on the voluntary coordination action for household biogas digesters development.

This CPA involves the installation and operation of approximately **XX,XXX** household biogas systems and their normal operation by providing further technical service during the crediting period at farmer households located in **GEOGRAPHICAL AREA**, Sichuan Province, China.

Wuhai Company i.e. the CME of the proposed PoA takes charge of implementing and managing the CPA, and the installation, operation, maintenance and other technical services are primarily executed by **CityName** Rural Energy Office (REO) under the supervision of the CME.

All the household biogas digesters included in the CPA had been constructed since **XX/XX/20XX**, and the inspection of acceptance check had been finished before **XX/XX/20XX** which indicated the operation date of the biogas digester subsystems.

By installing biogas digesters in which the animal manure can be used to generate biogas, the existing deep pits that are used to store the manure will be abandoned and methane emissions will be avoided. All digesters within the CPA will be installed by qualified and certified technicians from rural energy system. After the successful installation and commission of biogas digester system, technical service will be offered to the participating households on a regular basis to ensure a stable operation and prevent a relapse to old habits.

The biogas generated by the digesters will be fed into a newly equipped biogas stove that can be used for cooking purpose. This will lead to a reduction consumption of fossil fuel that is used by most households for cooking. As the biogas is a renewable resource, this will lead to a further reduction of CO₂ emissions. The residue effluent can be extracted from the biogas digesters easily and be used as organic fertilizer under an aerobic application of the sludge instead of additional CH₄ emissions.

The baseline scenario of the CPA are the use of deep pit for manure storage and the use of coal as main fuel for cooking purpose which emit greenhouse gases into the atmosphere directly. After the implementation of the CPA, the GHGs that would emit in the baseline scenario are deemed to be reduced. The average annual emission reduction expected from this CPA is **XX,XXX** tCO₂e.

A.3. Entity/individual responsible for the small-scale CPA:

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 3

CPA Implementer is specified as the entity/individual responsible of the CPA.

A.4. Technical description of the small-scale CPA:

A.4.1. Identification of the small-scale CPA:

A.4.1.1. Host Party:

People's Republic of China

A.4.1.2. Geographic reference or other means of identification allowing the unique identification of the small-scale CPA (maximum one page):

The households bundled in this CPA are located in **GEOGRAPHICAL AREA**, which covers the geographical coordinates of **XX° XX' XX" N-XX° XX' XX" N and XXX° XX' XX" E-XXX° XX' XX" E**.

The following figure shows the location of the CPA.

[MAP WITH THE LOCATION OF THE CPA]

[Figure]: Location of the CPA within Sichuan

A spreadsheet with all digesters installed and monitored under **CPA-XX(CityName)** until the respective date will be submitted to the DOE at the start of each periodic verification along with the monitoring report. By crosschecking the data of listed households including the serial number of the digester and the household location, all devices can be uniquely identified and attributed to the CPA.

A.4.2. Duration of the small-scale CPA:

A.4.2.1. Starting date of the small-scale CPA:

XX/XX/XXXX

This is the earliest date at which implementation of biogas units under the CPA will start or has started, thus it should be marked as the starting date of the CPA. The date shall not prior to 07/09/2011 i.e. the date that the PoA started global stakeholder publication on UNFCCC CDM website³.

A.4.2.2. Expected operational lifetime of the small-scale CPA:

20 years

³ <http://cdm.unfccc.int/ProgrammeOfActivities/Validation/gotoProj?id=Z37079IMS4ISXZV1GXDRKL4889PY58>

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 4

A.4.3. Choice of the crediting period and related information:

Renewable Crediting period.

A.4.3.1. Starting date of the crediting period:

XX/XX/XXXX

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

7 years for the first crediting period.

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

The estimated annual emission reduction is calculated based on the equations listed in the PoA-DD of the Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province, P.R. China.

The estimated average annual emission reduction is **XX,XXX** tCO₂e. Over the first crediting period of 7 years, the total emission reductions are therefore expected to amount to **XXX,XXX** tCO₂e.

[Table] Table1 Estimation of annual emission reductions of the CPA

| Year | Estimation of annual emission reductions in tonnes of CO ₂ e |
|--|---|
| 20XX | XX,XXX |
| 20XX | XX,XXX |
| 20XX | XX,XXX |
| 20XX | XX,XXX |
| 20XX | XX,XXX |
| 20XX | XX,XXX |
| 20XX | XX,XXX |
| 20XX | XX,XXX |
| Total estimated reductions (tonnes of CO ₂ e) | XX,XXX |
| Total number of crediting years | 7 |
| Annual average of the estimated reductions over the crediting period | XXX,XXX |

A.4.5. Public funding of the CPA:

No public funding from Annex-I countries is involved in the implementation of the CPA.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 5

A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component

As per the *Guidelines On Assessment Of Debundling For SSC Project Activities*:

10. If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity.

The thermal capacity of each biogas stove shall not exceed 3.59 kW, which is less than 1% of the scale thresholds defined by the methodology AMS-I.I. (45MWth is defined as threshold in AMS-I.I., so 1% should be 450kW). Meanwhile, the emission reduction resulting from methane avoidance is no more than 5 tCO₂e, which is also less than 1% of the scale thresholds defined by the methodology AMS-III.R. (60kt is defined as threshold in AMS-III.R, so 1% should be 600 tCO₂e). Therefore, it is not necessary to perform a de-bundling check. The CPA is considered as not being a de-bundled component of a large scale activity.

A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:

In order to avoid double counting and to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA, the Sichuan Rural Energy Office (SERO) who is the superior administrator of the local rural energy office has, in accordance with the eligibility criteria stipulated in section A.4.2.2 of the PoA-DD, confirmed with a written statement that:

1. The CPA and all biogas systems to be installed under the CPA have not been and will not be registered as a single CDM project activity nor as a CPA under another PoA.
2. The SREO and its local rural energy office are aware that the CPA will be subscribed to the present PoA.

SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which small-scale CPA is added:

Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province

B.2. Justification of the why the small-scale CPA is eligible to be included in the Registered PoA :

Eligibility criteria of the PoA and justification why they are fulfilled by the CPA:

- 1) The proposed CPA must be located within the geographical boundary of the PoA, i.e. the CPA shall lie within the following seven cities territory in Sichuan province: Deyang, Guangyuan, Bazhong, Nanchong, Yaan, Liangshan and Panzhihua;

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province

CDM – Executive Board



page 6

As all households are located in **XX City** of Sichuan, so the geographical boundary of the CPA lies within the boundary of the PoA.

- 2) Unique identifications of biogas digester subsystems included in a CPA that can indicate the programme logo shall be set for avoiding double counting of emission reductions;

For indicating those households which can satisfy all the conditions of the proposed PoA and are deemed to be include in a CPA (e.g. they use only coal as fossil fuel for cooking purpose and feed livestock and has deep pit for manure), the **CityName** REO allocated a unique ID number for each household in order to distinguish those digesters excluded in the PoA, furthermore, a special household database including the households of the CPA **has been/will be** set up for check;

- 3) The technology and process adopted by each biogas subsystem shall meet the *Technical Requirements for Sichuan Provincial Rural Biogas Construction Government Loan Project* adopted by SREO.

The following technologies are adopted by the biogas digesters in the CPA: **Masonry concrete structure and fibre glass cover structure**. They all meet the *Technical Requirements for Sichuan Provincial Rural Biogas Construction Government Loan Project* adopted by SREO.

- 4) The start date of CPA should not be prior to the date that the PoA began to go through global stakeholder comment on UNFCCC website, and the CPA crediting period shall not exceed the end date of PoA crediting period.

The start date of the CPA is **XX/XX/20XX**, which is later than 07/09/2011 i.e. the date that the proposed PoA began to go through global stakeholder comment on UNFCCC website. The CPA crediting period is 7 years with maximum 3 time of renewable which shall not exceed 28 years' credit period of the PoA.

- 5) The CPA shall meet all the applicable requirements as per the applied methodologies AMS-I.I and AMS.III.R.
- (a) Generates renewable thermal energy using biogas for use in residential applications.
 - (b) Comprises recovery and destruction of methane from manure and wastes from agricultural activities that would be decaying anaerobically emitting methane to the atmosphere in the absence of the project activity.
 - (c) Is limited to measures at individual households or small farms (e.g. installation of a domestic biogas digester). Methane recovery systems that achieve an annual emission reduction of less than or equal to five tonnes of CO₂e per system.
 - (d) The households currently use coal (including coal briquette) as fossil fuel source of energy for cooking purpose.
 - (e) Equip cook stoves with a rated capacity equal to or less than 150 kW thermal per household.
 - (f) The sludge must be handled aerobically.
 - (g) Measures shall be used to ensure that all the methane collected by the recovery system is destroyed.

The conditions to meet all the applicable requirements of AMS-I.I and AMS-III.R are demonstrated by the following facts:

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province



CDM – Executive Board

page 7

- (a) The CPA comprises the activity of generation of renewable thermal energy using biogas from newly constructed biogas digesters for use in residential applications.
 - (b) The farmer households have the habit of pig breeding and the animal manure generated is currently stored in deep pits in the absence of the project activity at which circumstances the manure would be decaying anaerobically emitting methane to the atmosphere. However by constructing a new biogas digester and installing gas tube and biogas stove for substitution of the deep pit, the methane from manure and waste is to be recovered and destroyed.
 - (c) The CPA is deemed to install a domestic biogas digester, obviously it's limited to measures at individual households. The digester capacity in the CPA is deemed to be **X** cube meters, which can not have a methane emission reduction potential above 5 tCO₂e.
 - (d) According to the criteria of household inclusion, the Rural Energy Office of **XX** County only considers households that have the habit of pig breeding, have deep pits to store manure and use coal for cooking in the baseline of inclusion in the proposed PoA.
 - (e) All the targeted households in this CPA shall construct a biogas digester equipped with a biogas stove with installed thermal capacity of about 2.33kW, 2.79kW or 3.26kW.
 - (f) The final sludge from biogas digester will be used as organic fertilizer in farmer land rather than in rice field or other anaerobic circumstances, so it's handled aerobically.
 - (g) In case that the biogas collected is enough for cooking purpose and cannot be used out, the remaining biogas must be combusted by the biogas stove for avoidance of methane emission to the atmosphere directly. Hence for each participating household the above conditions can be met.
- 6) The CPA shall remain within the threshold of small-scale project throughout the crediting period of the CPA, e.g. for small-scale CPA, the aggregated installed/rated thermal energy generation capacity of all biogas systems included in the CPA is equal to or less than 45 MW thermal for AMS-I.I and the annual emission reduction shall not exceed 60kt CO₂e for AMS-III.R;

This CPA includes **XX,XXX** households and the estimated annual average emission reduction is **XX,XXX** tCO₂e. According to corresponding national standard, The rated capacity of the biogas stove may be 2.33kW, 2.79kW and 3.26 kW and their fluctuation range of $\pm 10\%$ is accepted, thus each biogas stove shall be within 3.59kW, and from this value, the total capacity is calculated as **XX** MW. Therefore, this CPA is a small scale project throughout the crediting period that satisfying the criteria.

- 7) The CPA shall meet the requirements pertaining to the demonstration of additionality, that is:
- (a) the users of the technology/measure are isolated units (e.g. farmer households); and
 - (b) The installed capacity of biogas cooking stove in each household is no larger than 2,250kW thermal, and the emission reductions from avoiding methane emission of each household are no more than 3,000 tonnes per year.

Every user in the CPA is at farmer household level in **CityName**, and as described in the applicability of the selected methodologies, the installed capacity of biogas stove is no more than 3.59kW, and each biogas digester can reduce less than 5 tonnes of CO₂e because of the volume is deemed to be **X** cube meters. Therefore, the CPA meets this criterion.

- 8) The biogas digesters included in a CPA shall be constructed and operated at rural households level;

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province

CDM – Executive Board



page 8

All the biogas digesters included in this CPA have been or will be constructed and operated at rural household level.

- 9) The parameters deemed to be determined by sampling and survey shall meet the confidence/precision of 90/10 for annual measurement and 95/10 for biennial measurement.

According to section B.6 of the CPA, the confidence/precision of 90/10 is determined in sampling survey for annual measurement parameters and 95/10 for biennial measurement parameters involved in this CPA.

- 10) The CPA implementer confirms that:

- a) All biogas system to be newly installed under the CPA are not and will not be part of another CDM project or programme activity and that no CERs will be claimed for the biogas system other than those to be claimed by the CME on behalf of the CPA implementer and the participating households respectively; and
- b) That the CPA implementer is aware and agrees with the inclusion of the CPA to the proposed PoA.

The CPA is included into the PoA titled Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province, and it has not been and will neither be registered as a single CDM project activity nor as a CPA under another PoA. Moreover, a written agreement has been confirmed between the CME and SREO to ensure that SREO and its local subsidiaries are aware and agree with the inclusion of the CPA to the proposed PoA.

- 11) Each of the independent subsystems (the digesters and biogas stoves) is no larger than 1% of the small-scale thresholds defined by the methodologies applied (600 tCO₂e emission reductions from methane avoidance, 450 kW thermal installed capacity of the stove).

For a household, for meeting the requirement of AMS-III.R, the digester capacity is deemed to be **X** cube meters, which cannot have a methane emission reduction potential above 5 tCO₂e. Another side, according to Chinese national standard⁴, the three specifications of installed capacity of a stove are 2.33kW, 2.79kW and 3.26kW with a fluctuation range of $\pm 10\%$, so none of them reaches 450kW thermal.

- 12) No public funding from Annex I country involved in this CPA.

The local rural energy office taking charge in fund management of this CPA ensures that there is no public funding from Annex I country is involved in this CPA.

| |
|---|
| B.3. Assessment and demonstration of additionality of the <u>small-scale CPA</u> , as per eligibility criteria listed in the Registered PoA: |
|---|

The criteria listed in Section E.5.2.of the PoA-DD is as following:

Criteria

⁴ GB/T 3606-2001 “Domestic biogas stove

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 9

For a CPA under the proposed PoA:

- (1) The users of the technology/measure are isolated units (e.g. farmer households); and
- (2) *The installed capacity of biogas cooking stove in each household is no larger than 2,250kW thermal, and the emission reductions from avoiding methane emission of each household are no more than 3,000 tonnes per year.*

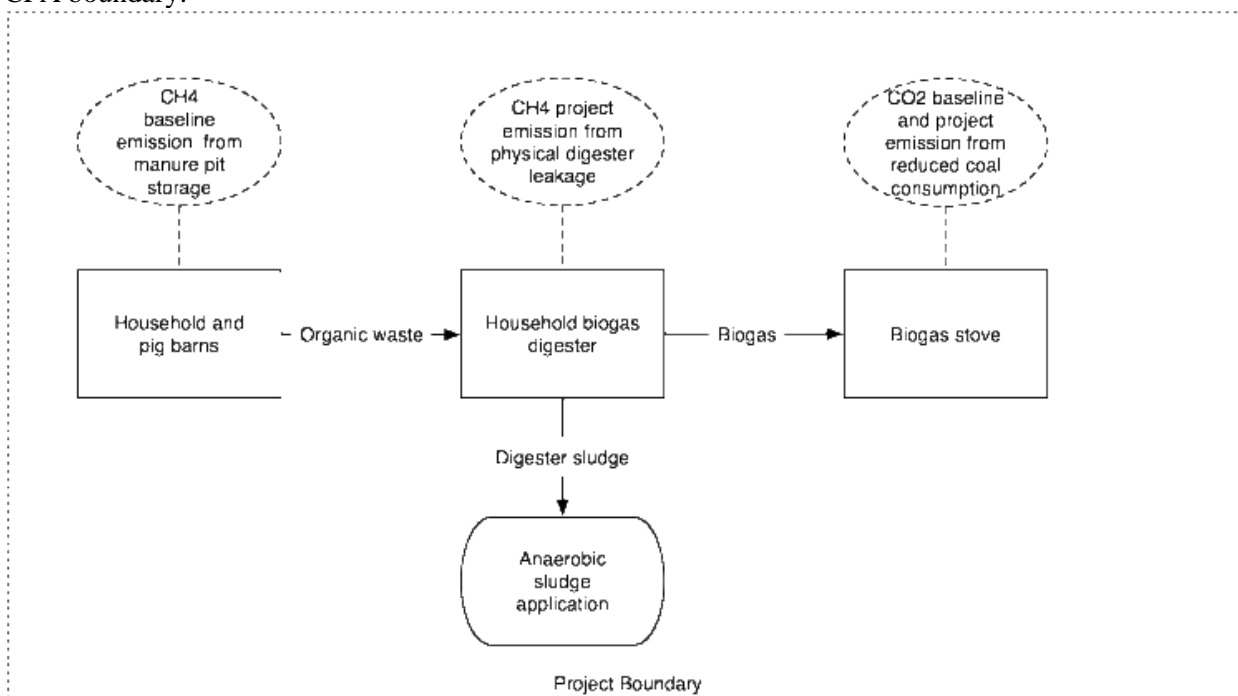
According to the household list of the CPA, all the biogas digesters are constructed at the farmer household level in **CityName** rural area, thus the users are isolated units.

At the same, the biogas stove equipped for each household is no more than 3.59kW, and by calculating, the annual emission reductions from avoiding methane emission of each household is less than 1 ton which is far less than 3,000 tonnes per year.

From above demonstration, a conclusion can be drawn that the additionality criteria are met by the CPA. Therefore, the CPA is additional.

B.4. Description of the sources and gases included in the project boundary and proof that the small-scale CPA is located within the geographical boundary of the registered PoA.

The geographic sites of all individual biogas systems included in the CPA define the SSC-CPA boundary. A biogas system consists of a bio digester and a cooking/combustion unit. All the biogas systems newly installed by the households in the CPA are within the territory of **CityName** which is involved in the PoA, thus the sources and gases are included in the project boundary. The figure below visualizes the SSC-CPA boundary:



[Figure]: Project boundary for one sample household

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province

CDM – Executive Board



page 10

Two different sources of GHG emissions are relevant for the proposed PoA and therefore included in its boundary:

a) Methane emissions from existing manure management systems:

Nearly all farmers and rural households with pigs use a deep pit as manure management system in the rural Sichuan Province. The storage in the pit for a retention time of longer than one month improves the fertilizer capacity of the manure and is the easiest way of handling the manure problem. However, this leads to the emission of methane that is generated due to the anaerobic conditions within the pit.

By installing biogas digesters, the generated methane will be captured and stored within the digester until it is utilized as energy source for cooking or heating. Thereby, the methane will be destroyed efficiently and its emission will be avoided.

b) Carbon dioxide emissions from fossil fuel consumption:

The predominant source of energy for cooking and heating in rural Sichuan is coal. Except for occasional events where straw or crop residues are available in little amounts, coal is used as main fuel for household purposes. As the biogas generated by the digesters can be stored within the device until it is used, the biogas can replace the fossil fuel as main fuel. Thereby, significant amounts of CO₂ emission will be reduced.

Additional to these explanations, the following table gives an overview on the emission sources included and excluded.

[Table] Emission sources Included/Excluded in the project boundary

| | GHG emission source | Gas | Included? | Justification/Explanation |
|--------------------------|---|------------------|-----------|--|
| Baseline Emission | Thermal energy used for cooking by fossil fuel consumption | CO ₂ | Yes | Major source of baseline emission. |
| | | CH ₄ | No | Excluded for simplification. This is conservative. |
| | | N ₂ O | No | Excluded for simplification. This is conservative. |
| | Existing manure management system | CO ₂ | No | Excluded as decomposition of organic waste is CO ₂ neutral. |
| | | CH ₄ | Yes | Major source of baseline emission. |
| | | N ₂ O | No | Excluded for simplification. This is conservative. |
| Project Emission | Fossil fuel or electricity consumption used for digester system operation | CO ₂ | No | No fossil fuel or electricity is needed for the operation or the biogas digester system. |
| | | CH ₄ | No | Not applicable |
| | | N ₂ O | No | Not applicable |
| | Thermal energy used for cooking by fossil fuel consumption | CO ₂ | Yes | Major source of emission. |
| | | CH ₄ | No | Not applicable; in line with the applied methodologies. |
| | | N ₂ O | No | Not applicable; in line with the applied methodologies. |
| | Leakage from biogas digester | CO ₂ | No | Excluded as decomposition of organic waste is CO ₂ neutral. |

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 11

| | | | | |
|--|--|-----------------------|------------|---|
| | | CH₄ | Yes | Leakage shall be assumed in accordance with the applied methodology |
| | | N₂O | No | Not applicable; in line with the applied methodologies. |

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

The following parameters are the global parameters that are defined in the PoA-DD and can be determined at validation for the CPAs:

| | |
|---|--|
| Data / Parameter: | N_{Total} |
| Data unit: | household |
| Description: | Total number of households with biogas digester located in city k, included in the CPA. |
| Source of data used: | Total number of biogas digester included in the CPA |
| Value applied: | Different value for each CPA |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Households are uniquely identified by name of the household principal, household address and serial number of the biogas digester. |
| Any comment: | |

| | |
|---|---|
| Data / Parameter: | $VS_{(T)}$ |
| Data unit: | kg dry matter head ⁻¹ day ⁻¹ |
| Description: | Daily volatile solid excreted per swine. |
| Source of data used: | 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, and Chapter 10, Table 10A-7(market swine). |
| Value applied: | 0.27 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | The types of swine in CityName belong to different regions including North America, Europe and Asia. From IPCC2006, the VS value for swine from North America is 0.27, and VS value for swine from any other regions is 0.3. Here for conservation, 0.27 is selected as the applied value. |
| Any comment: | |

| | |
|--------------------------|---|
| Data / Parameter: | D_y |
| Data unit: | day |
| Description: | Days per year, it's for calculating annual VS production. |
| Source of data used: | |

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province

CDM – Executive Board



page 12

| | |
|---|-----|
| Value applied: | 365 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | |
| Any comment: | |

| | |
|---|--|
| Data / Parameter: | $B_{0,LT}$ |
| Data unit: | m^3CH_4/kg |
| Description: | Maximum methane producing capacity for manure produced by livestock, of VS excreted. |
| Source of data used: | IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, and Chapter 10, Table 10A-7(swine). |
| Value applied: | 0.29 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | The types of swine in CityName belong to different regions including North America, Europe and Asia. From IPCC2006, the B_0 value for swine from North America is 0.48, and the B_0 value for swine from Europe is 0.45, and from Asia is 0.29. Here for conservation, 0.29 is selected as the applied value. |
| Any comment: | |

| | |
|---|---------------------------------------|
| Data / Parameter: | GWP_{CH_4} |
| Data unit: | NA |
| Description: | Global Warming Potential for CH_4 . |
| Source of data used: | IPCC 2006 Guidelines |
| Value applied: | 21 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Official data |
| Any comment: | |

| | |
|--------------------------|---|
| Data / Parameter: | D_{CH_4} |
| Data unit: | t/m^3 |
| Description: | Conversion factor of $m^3 CH_4$ to kilogram CH_4 . |
| Source of data used: | 2006 IPCC guidelines, Volume 4, Chapter 10, Page 10.42. |
| Value applied: | 0.00067 |
| Justification of the | Official data |

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province

CDM – Executive Board



page 13

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|--|--|
| choice of data or description of measurement methods and procedures actually applied : | |
| Any comment: | |

| | |
|---|---|
| Data / Parameter: | UF_b |
| Data unit: | NA |
| Description: | Model correction factor to account for model uncertainties |
| Source of data used: | Methodology AMS-III.D referenced in the adopted methodology AMS-III.R |
| Value applied: | 0.94 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | |
| Any comment: | |

| | |
|---|--|
| Data / Parameter: | MCF_j |
| Data unit: | % |
| Description: | Annual methane conversion factor (MCF) for the baseline animal manure management system j |
| Source of data used: | IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 10, Table 10A-7 and Table 10.17(swine), at the temperature of 17 °C . |
| Value applied: | 29 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | The value is obtained from IPCC2006 based on the average temperature of XX City of year 20 XX . The temperature is XX °C got from Sichuan Year Book 20 XX . |
| Any comment: | |

| | |
|---|---|
| Data / Parameter: | $MS\%_{Bl,j}$ |
| Data unit: | % |
| Description: | Fraction of manure handled in baseline animal manure management system j (i.e. deep pit) |
| Source of data used: | According to the real manure management practice of the households |
| Value applied: | 100 |
| Justification of the choice of data or description of | Deep pit storage is adopted for the animal manure management in the farmer households in this project. All the animal manure goes into the pit directly with a channel connected with the pigpen and the pit. |

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 14

| | |
|---|--|
| measurement methods and procedures actually applied : | |
| Any comment: | |

| | |
|---|--|
| Data / Parameter: | EF_{Coal} |
| Data unit: | t CO ₂ e/TJ |
| Description: | Emission factor of raw coal |
| Source of data used: | Table 2.2 Chapter 2, Volume 2, IPCC 2006 |
| Value applied: | 94.6 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | In Sichuan Province, the rural households may use the following types of coal: Anthracite, Other Bituminous Coal, and Lignite, with respective emission factor of 98.3, 94.6, and 101.0. Here the value of 94.6 is selected in a conservative way. |
| Any comment: | |

| | |
|---|---|
| Data / Parameter: | $\eta_{PJ/BL}$ |
| Data unit: | NA |
| Description: | Ratio of efficiencies of project equipment and baseline equipment (e.g. cook stove using coal) |
| Source of data used: | Measure once prior to validation |
| Value applied: | 2.75 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | The default efficiency η for Biogas stoves (PJ) is taken to be 55% The efficiency of the coal-fired stoves (BL Coal) to be replaced η is taken to be 20%. See E.6.2. in detail. |
| Any comment: | |

B.5.2. Ex-ante calculation of emission reductions:

In this section, only the formula and input values will be addressed for the calculation of the results. For a detailed description of the calculation methods, please see the related PoA-DD.

1. AMS-I.I - Biogas/biomass thermal applications for households/small users (version 03)

$$ER_{FF,y} = \sum_k N_{k,0} * n_{k,y} * BS_{k,y} * EF * \eta_{PJ/BL} * NCV_{biogas} - LE_y \quad (1)$$

$$EF = \sum_j x_j * EF_{FF,j} \quad (2)$$

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 15

[Table] Input values for the parameters for calculation of emission reduction

| Parameter | Unit | Value | Comment |
|---|-----------------------|--------|--|
| $N_{k,0}$ | / | XX,XXX | Assumed that one thermal application is installed in each household. Real value depends on the number of thermal applications commissioned. |
| $n_{k,y}$ | % | 100 | Assumed. Real value will be decided by the proportion of thermal applications that remain operating in year y. |
| x_{Coal} | % | 100 | Only one type of fossil fuel e.g. coal is used by the household in the baseline. |
| $BS_{k,y}$ | m ³ | 350 | Assumed. Real value will be decided by monitoring result. |
| EF_{Coal} | tCO ₂ e/TJ | 94.6 | The data is from section B.5.1. |
| $\eta_{PJ/BL,Coal}$ | / | 2.75 | The data is from section B.5.1. |
| NCV_{biogas} | GJ/m ³ | 0.0215 | Data from the adopted methodology AMS-I.I |
| $ER_{FF,y} = \text{XX,XXX tCO}_2\text{e}$ | | | |

With the input values used for this CPA, the estimated annual emission reduction is **XX,XXX** tCO₂e.

2. AMS-III.R-Methane recovery in agricultural activities at household/small farm level (version 02)

2.1 Baseline emissions

The methane baseline emissions per household are defined as:

$$BE_{CH_4,k,y} = GWP_{CH_4} * D_{CH_4} * UF_b * \sum_{j,LT} MCF_j * B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{BL,j} \quad (3)$$

[Table] Values for estimating methane baseline emissions

| Parameter | Unit | Value | Comment |
|--------------|---------------------------------------|---------|---|
| GWP_{CH_4} | tCO ₂ /tCH ₄ | 21 | Data from the adopted methodology AMS-III.R |
| D_{CH_4} | t/m ³ | 0.00067 | Data from the adopted methodology AMS-III.R |
| MCF_j | % | 29 | IPCC 2006 |
| $B_{0,LT}$ | m ³ CH ₄ /kg dm | 0.29 | IPCC 2006 |
| $N_{LT,y}$ | numbers | 4.65 | Baseline survey. Real value will be determined by sampling survey. |
| $VS_{LT,y}$ | kg dm/animal/year | 98.55 | $VS_{LT,y} = VS_{(T)} * D_y$ |
| $VS_{(T)}$ | kg dm/animal/day | 0.27 | IPCC |
| D_y | days | 365 | Days per year. |

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 16

| | | | |
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| $MS\%_{Bl,j}$ | % | 100 | Real situation in Baseline. |
| UF_b | / | 0.94 | Data from the referenced methodology AMS-III.D |
| $BE_{CH4,k,y} = 21 \times 0.00067 \times 0.94 \times 29\% \times 0.29 \times 4.65 \times 98.55 \times 100\% = 0.5097 \text{ tCO}_2\text{e/yr}$ | | | |

2.2 Project emissions

The project emissions covered by methodology AMS-III.R are described by the following formula:

$$PE_{CH4,k,y} = 0.10 * GWP_{CH4} * D_{CH4} * \sum_{i,LT} B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{i,y} \quad (4)$$

$$VS_{LT,y} = VS_{(T)} * D_y \quad (5)$$

[Table] Values for estimating methane project emissions

| Parameter | Unit | Value | Comment |
|---|---------------------------------------|---------|---|
| GWP_{CH4} | tCO ₂ /tCH ₄ | 21 | Data from the adopted methodology AMS-III.R |
| D_{CH4} | t/m ³ | 0.00067 | Data from the adopted methodology AMS-III.R |
| $B_{0,LT}$ | m ³ CH ₄ /kg dm | 0.29 | IPCC 2006 |
| $N_{LT,y}$ | numbers | 4.65 | Assumed that the data equals to the data in baseline scenario. Real value will be determined by sampling survey. |
| $VS_{LT,y}$ | kg dm/animal/year | 98.55 | $VS_{LT,y} = VS_{(T)} * D_y$ |
| $VS_{(T)}$ | kg dm/animal/day | 0.27 | IPCC |
| D_y | days/yr | 365 | Days per year. |
| $MS\%_{i,y}$ | % | 100 | Conservation way. |
| $PE_{CH4,k,y} = 0.1 \times 21 \times 0.00067 \times 0.29 \times 4.65 \times 98.55 \times 100\% = 0.1870 \text{ tCO}_2\text{e/yr}$ | | | |

2.3 Leakage

The applied AMS-III.R says that if the methane recovery and combustion equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered. However for the CPA, no transfer in and/or out will occur, therefore, the leakage is regarded as zero.

2.4 Emission reduction

Based on baseline emission and project emission, the annual emission reduction can be calculated:

$$ER_{CH4,y} = \sum_k N_k \bullet (BE_{CH4,k,y} - PE_{CH4,k,y}) \quad (6)$$

Where:

N_k Number of households with active biogas digester located in city k, included in the CPA.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 17

$$ER_{CH_4,y} = \text{XX,XXX} \text{ tCO}_2\text{e/yr}$$

With the input values used for this CPA, the estimated annual emission reduction is **XX,XXX** tCO₂e.

3. Bundled emission reductions for a specific CPA

The emission reductions of all households of one specific CPA in year y are:

$$ER_y = ER_{FF,y} + ER_{CH_4,y} \quad (7)$$

$$ER_y = \text{XX,XXX} \text{ tCO}_2\text{e/yr}$$

With a projected number of **XX,XXX** households in the CPA, the expected annual project emission is **XX,XXX** tCO₂e.

B.5.3. Summary of the ex-ante estimation of emission reductions:

>>

[Table] Summary of the ex-ante estimation of emission reductions

| Year | Estimation of project activity emissions (tonnes of CO ₂ e) | Estimation of baseline emissions (tonnes of CO ₂ e) | Estimation of leakage (tonnes of CO ₂ e) | Estimation of overall emission reductions (tonnes of CO ₂ e) |
|---|--|--|---|---|
| Year 20XX | - | - | 0 | XX,XXX |
| Year 20XX | - | - | 0 | XX,XXX |
| Year 20XX | - | - | 0 | XX,XXX |
| Year 20XX | - | - | 0 | XX,XXX |
| Year 20XX | - | - | 0 | XX,XXX |
| Year 20XX | - | - | 0 | XX,XXX |
| Year 20XX | - | - | 0 | XX,XXX |
| Total (tonnes of CO ₂ e) | - | - | 0 | XXX,XXX |

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

1. Organizational setup

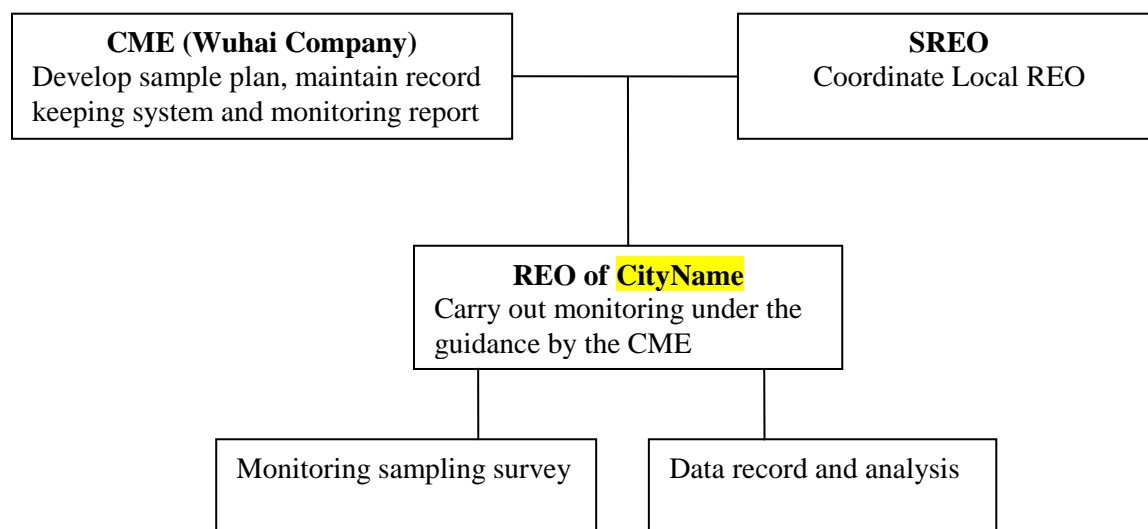
**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 18



[Figure] Structure for monitoring organization

The Sichuan Rural Energy Office will facilitate the CME to guide the REO of **CityName** for carrying out monitoring of the CPAs. The data will be collected and recorded by the REO of **CityName** and forwarded to the CME to complete record keeping system and based on which the monitoring report for each CPA will be prepared.

2. Data monitored

The local Rural Energy Office will conduct a survey for each CPA. The data collected are listed in the tables below:

| | |
|--|---|
| Data / Parameter: | T |
| Data unit: | °C |
| Description: | Mean annual temperature in CityName involved in the CPA. This parameter determines the emission factors of the existing manure management systems. |
| Source of data to be used: | Data from the latest version of Sichuan Statistical Yearbook. |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | XX °C, the data is from 20 XX Sichuan Statistical Yearbook |
| Description of measurement methods and procedures to be applied: | This value is determined by the annual average temperature of CityName from the latest Sichuan Statistical Yearbook. |
| QA/QC procedures to | |

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province

CDM – Executive Board



page 19

| | |
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| be applied: | |
| Any comment: | |

| | |
|--|--|
| Data / Parameter: | $N_{LT,y}$ |
| Data unit: | head |
| Description: | Annual average animal population at the household. |
| Source of data to be used: | Survey methods. |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | Ex-ante value (4.65) is taken from the baseline survey for ex- estimating the emission reductions. While the real value shall be determined by sampling survey. |
| Description of measurement methods and procedures to be applied: | Sampling monitoring survey with a sampling size determined following the latest guidelines and the applied methodologies. |
| QA/QC procedures to be applied: | To determine the monitoring parameters, a sample study will be for each CPA. In line with methodology, the confidence interval is 90%, while the margin of error is 10%. |
| Any comment: | |

| | |
|--|--|
| Data / Parameter: | $MS\%_{i,y}$ |
| Data unit: | % |
| Description: | Fraction of manure handled in project animal manure management system i (i.e. digestion in the newly installed biogas digester) |
| Source of data to be used: | Sampling survey. |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | 100 used for estimating the emission reduction. While the real value shall be determined by sampling survey. |
| Description of measurement methods and procedures to be applied: | An annual sampling monitoring survey during monitoring a period with a sampling size determined following the applied methodologies or the latest sampling standard. |
| QA/QC procedures to be applied: | |
| Any comment: | |

| | |
|--------------------------|--|
| Data / Parameter: | Sludge application |
| Data unit: | NA |
| Description: | The proper soil application of the final sludge from the digester which shall be handled aerobically for not resulting in methane emissions. |

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province

CDM – Executive Board



page 20

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| Source of data to be used: | Sample survey |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | It's not needed for calculating expected emission reductions. |
| Description of measurement methods and procedures to be applied: | It shall be verified once during a monitoring period on a sampling basis. |
| QA/QC procedures to be applied: | |
| Any comment: | |

| | |
|--|--|
| Data / Parameter: | $N_{k,0}$ |
| Data unit: | NA |
| Description: | Number of thermal applications k commissioned. |
| Source of data to be used: | Commission record |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | Assumed that one thermal application is commissioned for each household, then XX,XXX (equals to N_{Total}) will be used for ER evaluation in PDD, while the real value shall be determined by monitoring sampling survey. |
| Description of measurement methods and procedures to be applied: | After the installation of the bio-digesters and biogas stoves, they shall be inspected as acceptance testing (commissioning) for proper operation in compliance with specifications. The acceptance check date of each subsystem shall be recorded. |
| QA/QC procedures to be applied: | The systems should be operated in compliance with manufacturer required maintenance at least once every two years (biennial) during the crediting period. A statistically valid sample of the residences where the systems are installed, with consideration, in the sampling design, of occupancy and demographic differences can be used to determine the percentage of systems operating, as per the relevant requirements for sampling in the .General guidelines for sampling and surveys for small-scale CDM project activities. |
| Any comment: | |

| | |
|----------------------------|--|
| Data / Parameter: | $n_{k,y}$ |
| Data unit: | % |
| Description: | Proportion of $N_{k,0}$ that remain operating at year y (fraction) |
| Source of data to be used: | Sampling survey |
| Value of data applied | 100 |

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province



CDM – Executive Board

page 21

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|--|--|
| for the purpose of calculating expected emission reductions in section B.5 | |
| Description of measurement methods and procedures to be applied: | The CME will inspect that the biogas units are operational and in compliance with the required maintenance procedures from the manufacturers at least every two years during the crediting period. Monitoring will be done through a statistically valid sample of the households where the systems are installed as per the relevant requirements for sampling in the latest standard for sampling and surveys using a 95% confidence interval and a 5% margin of error. If the inspection happens on an annual basis, a confidence interval of 90% and 10% error margin can be applied. |
| QA/QC procedures to be applied: | The systems should be operated in compliance with manufacturer required maintenance at least once every two years (biennial) during the crediting period. A statistically valid sample of the residences where the systems are installed, with consideration, in the sampling design, of occupancy and demographic differences can be used to determine the percentage of systems operating, as per the relevant requirements for sampling in the .General guidelines for sampling and surveys for small-scale CDM project activities. |
| Any comment: | |

| | |
|--|--|
| Data / Parameter: | $BS_{k,y}$ |
| Data unit: | m^3 |
| Description: | The net quantity of renewable biogas consumed by the thermal application k in year y |
| Source of data to be used: | Sample survey |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | 350 m^3 will be used for ER evaluation in PDD, while the real value shall be determined by monitoring sampling survey. |
| Description of measurement methods and procedures to be applied: | Gas meters are used to monitor accumulated biogas supplied to thermal energy equipment. Measurement campaigns shall be undertaken at selected sites. At least five campaigns per digester type shall be carried out in each year of the crediting period. Continuous measurement made for at least one month at a single digester is considered as a campaign. Monthly average value is annualised taking into account seasonal variation in gas production which is mainly a function of ambient temperature. |
| QA/QC procedures to be applied: | The systems should be operated in compliance with manufacturer required maintenance at least once every two years (biennial) during the crediting period. A statistically valid sample of the residences where the systems are installed, with consideration, in the sampling design, of occupancy and |

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province

CDM – Executive Board



page 22

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| | demographic differences can be used to determine the percentage of systems operating, as per the relevant requirements for sampling in the .General guidelines for sampling and surveys for small-scale CDM project activities. |
| Any comment: | |

| | |
|--|--|
| Data / Parameter: | NCV_{Biogas} |
| Data unit: | GJ/m ³ |
| Description: | Net calorific value of the biogas |
| Source of data to be used: | Applied methodology AMS-I.I. |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | 0.0215 |
| Description of measurement methods and procedures to be applied: | Obtained from the applied methodology AMS-I.I. |
| QA/QC procedures to be applied: | |
| Any comment: | |

3. Monitoring sampling study

To monitor the parameters required by the applied methodologies, a sampling plan is intentionally developed by the CME.

Sampling Plan

(a) Sampling Design:

- **Objectives and Reliability Requirements:**

The objective is determining the mean value or the percentage of the monitoring parameters listed in specific CPA-DD that to be determined by sampling and surveys during the crediting period, and with at least 90/10 confidence/precision.

- **Target Population:**

The target population of the sampling is the total households in a specific CPA.

- **Sampling Method:**

Simple random sampling or stratified random sampling method will be selected as the sampling method for the project.

- **Sample Size:**

The sample size for each CPA or a batch of CPAs shall be calculated by the formula provided by the GUIDELINES FOR SAMPLING AND SURVEYS FOR CDM PROJECT ACTIVITIES AND

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 23

PROGRAMME OF ACTIVITIES and based on necessary information below: the parameter of interest, the value it is expected to take and an estimate of the variance associated with the data, as well as the level of confidence and precision (if the parameter of interest is a proportion, or a percentage, then there is no need to specify a variance estimate).

The formula for calculation of sample size is as below:

- (1) **In case of one type of digester volume, the simple random sampling will apply to the CPA.** There are two types of parameters of interests: mean value or proportion.

Pertaining to proportion parameters, the equation used to calculate sample size is as the following:

$$n \geq \frac{1.645^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.645^2 p(1-p)}$$

Where:

n Sample size

N Total number of households

p Our expected proportion (0.50)⁵

1.645 Represents the 90% confidence required

0.1 Represents the 10% relative precision ($0.1 \times 0.5 = 0.05 = 5\%$ points either side of p)

Pertaining to mean value parameter i.e. $N_{LT,y}$, the equation used to calculate sample size is:

$$n \geq \frac{1.645^2 NV}{(N-1) \times 0.1^2 + 1.645^2 V}$$

Where:

$$V = \left(\frac{SD}{mean} \right)^2$$

n Sample size

N Total number of households

Mean Our expected mean⁶)

SD Our expected standard deviation⁶

1.645 Represents the 90% confidence required

0.1 Represents the 10% relative precision

⁵ This assumes that 50% of the biogas digester subsystems would be operating. If we changed our prior belief of the underlying true percentage of working stoves p , this sample size would need recalculating.

⁶ As per paragraph 41 of Guidelines for sampling and surveys for cdm project activities and programme of activities Version02.0 (EB69 Annex5), the value can be obtained from these ways: (a) We may refer to the result of previous studies and use these results; (b) In a situation where we do not have any information from previous studies, we could take a preliminary sample as a pilot and use that sample to provide our estimates; (c) We could use “best guesses” based on the researcher’s own experiences.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



CDM – Executive Board

NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province



page 24

- (2) In case of more than one type of digester volume, the stratified random sampling will apply to the CPA. There are also two types of parameters of interests: mean value or proportion.

Pertaining to proportion parameters, the equation used to calculate sample size is as the following:

$$n \geq \frac{1.645^2 NV}{(N-1) \times 0.1^2 + 1.645^2 V}$$

Where:

n Sample size

N Total number of households

$$V = \frac{SD^2}{\bar{p}^2} = \frac{\text{overall variance}}{\bar{p}^2}$$

\bar{p} The overall proportion

To then decide on the number of households in the sample that come from each type of digester volume, we could use proportional allocation, where the proportions of units from the different volumes in the sample are the same as the proportions in the population. This gives

$$n_i = \frac{g_i}{N} \times n$$

, where $i=1, \dots, k$ and k is the digester types of volume in the CPA.

Where:

g_i Size of the i^{th} group (digester volume) where $i=1, \dots, k$

N Population total

The calculation of the overall variance and proportion are as below:

$$SD^2 = \frac{(g_a \times p_a(1-p_a)) + (g_b \times p_b(1-p_b)) + (g_c \times p_c(1-p_c)) + \dots + (g_k \times p_k(1-p_k))}{N}$$

$$\bar{p} = \frac{(g_a \times p_a) + (g_b \times p_b) + (g_c \times p_c) + \dots + (g_k \times p_k)}{N}$$

Pertaining to mean value parameters, the equation used to calculate sample size is:

$$n \geq \frac{1.645^2 \times NV}{(N-1) \times 0.1^2 + 1.645^2 V}$$

Where:

$$V = \left(\frac{SD}{\text{mean}} \right)^2$$

SD Is the overall standard deviation, and

Mean Is the overall mean.

The calculation of Overall Standard Deviation is according to the following:

$$SD = \sqrt{\frac{(g_a \times SD_a^2) + (g_b \times SD_b^2) + (g_c \times SD_c^2) + \dots + (g_k \times SD_k^2)}{N}}$$

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 25

Where:

SD Weighted overall standard deviation

SD_i Standard deviation of the *ith* group where *i*=1,...,*k*, (note that these are all squared – so the group size is actually being multiplied by the group variance)

g_i Size of the *ith* group where *i*=1,...,*k*

N Population total

$$mean = \frac{(g_a \times m_a) + (g_b \times m_b) + (g_c \times m_c) + \dots + (g_k \times m_k)}{N}$$

Where:

Mean Weighted overall mean

m_i Mean of the *ith* group where *i*=1,...,*k*

● **Sampling Frame:**

The sampling frame is the whole households with newly built biogas digesters in the CPAs, and the list can be obtained from the households database of the CPAs.

(b) Data:

● **Field Measurements:**

Please see the variables and their timing and frequency of surveys in corresponding section in specific CPA-DD.

● **QA/QC:**

- Training of field personnel will be conducted before baseline sampling survey;
- Notice households to wait home before investigation;
- Enlarge samples to be addressed to a certain extend for ensuring that the valid feedbacks to be received can meet the sample size.

● **Analysis:**

The baseline data will be converged and the average value of each parameter will be calculated.

(c) Implementation:

● **Implementation Plan:**

- Sampling targets: Identify the households to be investigated during the surveys;
- Schedule for implementing: arrange the time and routine for surveys;
- Qualifications and experience of personnel: All investigators will be trained prior to the surveys.

4. Data management

The electronic data from the local Rural Energy Offices will be collected and structured and forwarded to the CME.

Together with the hard copies that will be collected by the SREO and forwarded to the CME, all data and documents will be archived by the CME and provided to the verifying DOE on demand.

All data and documents will be archived by the CME until at least two years after the CPA crediting period is finished.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 26

5. QA/QC

All the procedures and/or methods adopted during the monitoring shall comply with the requirements of the applied methodologies and guidelines and/or any other referenced documents. All the data/parameters involved in the monitoring shall satisfy corresponding methods/procedures described in this PoA-DD. In case of any unexpected situation, urgent solution shall be given properly.

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

The information of environmental analysis is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

The information of environmental analysis is provided at the PoA level, so this section need be completed.

C.3. Please state whether an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA), in accordance with the host Party laws/regulations:

The information of environmental analysis is provided at the PoA level, so this section need be completed.

SECTION D. Stakeholders' comments

>>

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

✓ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

The stakeholder meeting and the visit to households was conducted on PoA level rather than CPA level, however the result showed that all invited stakeholders were positive towards the implementation of the CDM PoA and do not have negative concerns about the PoA and its CPAs.

D.3. Summary of the comments received:

The stakeholder meeting and the visit to households was conducted on PoA level rather than CPA level,

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven
Regions of Sichuan Province

CDM – Executive Board



page 27

however the result showed that all invited stakeholders were positive towards the implementation of the CDM PoA and do not have negative concerns about the PoA and its CPAs.

| |
|---|
| D.4. Report on how due account was taken of any comments received: |
|---|

The stakeholder meeting and the visit to households was conducted on PoA level rather than CPA level, however the result showed that all invited stakeholders were positive towards the implementation of the CDM PoA and do not have negative concerns about the PoA and its CPAs.

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven Regions of Sichuan Province
CDM – Executive Board



page 28

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA

| | |
|------------------|---|
| Organization: | Sichuan Wuhai Environmental Protection & Bioengineering CO., Ltd. |
| Street/P.O.Box: | Room 401, 2 nd unit, NO.133, Wangping Street |
| Building: | |
| City: | Chengdu |
| State/Region: | Sichuan Province |
| Postfix/ZIP: | 600021 |
| Country: | P.R.China |
| Telephone: | 86 28 84475518 |
| FAX: | 86 28 84479989 |
| E-Mail: | scestt@263.net |
| URL: | |
| Represented by: | Sun Gaofeng |
| Title: | General Manager |
| Salutation: | Mr. |
| Last Name: | Sun |
| Middle Name: | |
| First Name: | Gaofeng |
| Department: | |
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**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven
Regions of Sichuan Province
CDM – Executive Board



page 29

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven
Regions of Sichuan Province
CDM – Executive Board



page 30

Annex 3

BASELINE INFORMATION

SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01



NAME /TITLE OF THE PoA: Rural Household Biogas Digester Programme in Seven
Regions of Sichuan Province
CDM – Executive Board



page 31

Annex 4

MONITORING INFORMATION
